

# HALEY A. VECCHIARELLI, PHD

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## PROFILE

[haleyvecchiarelli@uvic.ca](mailto:haleyvecchiarelli@uvic.ca)

University of Victoria  
Division of Medical Sciences  
Medical Sciences Building  
Room 104  
Victoria, BC, V8P 5C2  
Canada

I am an international postdoctoral fellow (from the United States) working with Dr. Marie-Ève Tremblay at the Division of Medical Sciences, University of Victoria in Victoria, BC, Canada. Broadly my research interests are to understand how the immune system affects the central nervous system to influence behaviour. My current work looks at how chronic stress influences microglia to produce cognitive deficits. I investigate this using *in-vivo* 2-photon imaging, electron microscopy and behavioural analysis.

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## EDUCATION

### **University of Calgary, Calgary, AB, Canada — Ph.D., Neuroscience**

September 2014 — January 2020

*Thesis:* "Investigating the Role of Central Endocannabinoids and Inflammation in Comorbid Anxiety-Like Behaviour and Colitis"

*Supervisor:* Dr. Matthew Hill

### **University of Calgary, Calgary, AB, Canada — MSc., Neuroscience**

September 2012 — September 2014

*Thesis:* "Temporal Mapping of Stress Induced Central and Circulating Cytokine Production"

*Supervisor:* Dr. Matthew Hill

### **Barnard College, Columbia University, New York, NY, USA — B.A., Neuroscience and Behavior**

September 2006 — May 2010

*Thesis:* "Identification and Anatomic Characterization of Dendritic Cells in the Brain Following Intranasal Administration of Copolymer 1"

*Supervisor:* Dr. Karen Bulloch

## RESEARCH TRAINING

### **University of Victoria, Victoria, BC, Canada: Postdoctoral Fellow**

January 2020 — Ongoing

*Supervisor:* Dr. Marie-Ève Tremblay

### **The Rockefeller University, New York, NY, USA:**

#### **Research Assistant and Laboratory Manager, Neuroimmunology & Inflammation Program**

June 2010 — August 2012

*Supervisor:* Dr. Karen Bulloch

### **NSF-REU Shenandoah Partnership in Molecular Biology, Harrisonburg, VA, USA: Participant**

May 2008 — August 2008

*Supervisor:* Dr. Greta Ann Herin

### **Barrow Neurological Institute, St. Joseph's Hospital & Medical Center, Phoenix, AZ, USA:**

#### **Technician, Cognitive Neurometabolism Laboratory**

January 2004 — August 2007

*Supervisor:* Dr. Jon Valla

## PUBLICATIONS & PRESENTATIONS

Total output: 25 peer-reviewed journal articles (4 first-authored; 2 in preparation), 1 continuing medical education (CME) article, 1 book chapter, 3 invited talks, 12 oral presentations, and 27 poster presentations.

Citations: 857 (Google Scholar), 624 (Scopus)

h-index: 13 (Google Scholar), 12 (Scopus)

### PEER-REVIEWED JOURNAL ARTICLES

(\* denotes equal contribution; underline indicates mentored students)

Šimončičová E\*, Gonçalves de Andrade E\*, **Vecchiarelli HA**, Awogbindin IO, Delage CI, Tremblay MÈ.

Present and future of microglial pharmacology.

*Trends Pharmacol Sci.* 2022 Jan 3;S0165-6147(21)00223-6. doi: 10.1016/j.tips.2021.11.006. Online ahead of print.

**Vecchiarelli HA**, Aukema RJ, Hume C, Chiang V, Morena M, Keenan CM, Nastase AS, Lee FS, Pittman QJ, Sharkey KA, Hill MN.

Genetic Variants of Fatty Acid Amide Hydrolase Modulate Acute Inflammatory Responses to Colitis in Adult Male Mice.

*Front Cell Neurosci.* 2021 Nov 22;15:764706. doi: 10.3389/fncel.2021.764706. eCollection 2021.

Strzelewicz AR, **Vecchiarelli HA**, Rondón-Ortiz AN, Raneri A, Hill MN, Kentner AC.

Interactive effects of compounding multidimensional stressors on maternal and male and female rat offspring outcomes.

*Horm Behav.* 2021 Aug;134:105013. doi: 10.1016/j.yhbeh.2021.105013. Epub 2021 Jun 23.

Sanchez-Arias JC, van der Slagt E, **Vecchiarelli HA**, Candlish RC, York N, Young PA, Shevtsova O, Juma A, Tremblay MÈ, Swayne LA.

Purinergic signaling in nervous system health and disease: Focus on pannexin 1.

*Pharmacol Ther.* 2021 Sep;225:107840. doi: 10.1016/j.pharmthera.2021.107840. Epub 2021 Mar 19.

Gonçalves de Andrade E, Šimončičová E, Carrier M, **Vecchiarelli HA**, Robert MÈ, Tremblay MÈ.

Microglia Fighting for Neurological and Mental Health: On the Central Nervous System Frontline of COVID-19 Pandemic.

*Front Cell Neurosci.* 2021 Feb 18;15:647378. doi: 10.3389/fncel.2021.647378. eCollection 2021.

Picard K, St-Pierre MK, **Vecchiarelli HA**, Bordeleau M, Tremblay MÈ.

Neuroendocrine, neuroinflammatory and pathological outcomes of chronic stress: A story of microglial remodeling.

*Neurochem Int.* 2021 May;145:104987. doi: 10.1016/j.neuint.2021.104987. Epub 2021 Feb 12.

**Vecchiarelli HA**, Morena M, Keenan CM, Chiang V, Tan K, Qiao M, Leitl K, Santori A, Pittman QJ, Sharkey KA, Hill MN.

Comorbid anxiety-like behavior in a rat model of colitis is mediated by an upregulation of corticolimbic fatty acid amide hydrolase.

*Neuropsychopharmacology.* 2021 Apr;46(5):992-1003. doi: 10.1038/s41386-020-00939-7. Epub 2021 Jan 15.

Hui CW, **Vecchiarelli HA**, Gervais É, Luo X, Michaud F, Scheefhals L, Bisht K, Sharma K, Topolnik L, Tremblay MÈ.

Sex Differences of Microglia and Synapses in the Hippocampal Dentate Gyrus of Adult Mouse Offspring Exposed to Maternal Immune Activation.

*Front Cell Neurosci.* 2020 Oct 15;14:558181. doi: 10.3389/fncel.2020.558181. eCollection 2020.

Bialecki J, Werner A, Weilingner NL, Tucker CM, **Vecchiarelli HA**, Egaña J, Mendizabal-Zubiaga J, Grandes P, Hill MN, Thompson RJ.

Suppression of Presynaptic Glutamate Release by Postsynaptic Metabotropic NMDA Receptor Signalling to Pannexin-1.

*J Neurosci.* 2020 Jan 22;40(4):729-742. doi: 10.1523/JNEUROSCI.0257-19.2019. Epub 2019 Dec 9.

VanRyzin JW, Marquardt AE, Argue KJ, **Vecchiarelli HA**, Ashton SE, Arambula SE, Hill MN, McCarthy MM.

Microglial Phagocytosis of Newborn Cells Is Induced by Endocannabinoids and Sculptures Sex Differences in Juvenile Rat Social Play.

*Neuron.* 2019 Apr 17;102(2):435-449.e6. doi: 10.1016/j.neuron.2019.02.006. Epub 2019 Feb 28.

Morena M, Aukema RJ, Leitl KD, Rashid AJ, **Vecchiarelli HA**, Josselyn SA, Hill MN.

Upregulation of Anandamide Hydrolysis in the Basolateral Complex of Amygdala Reduces Fear Memory Expression and Indices of Stress and Anxiety.

*J Neurosci.* 2019 Feb 13;39(7):1275-1292. doi: 10.1523/JNEUROSCI.2251-18.2018. Epub 2018 Dec 20.

- Guo Z, Tse YC, Zhang Y, Sun Q, **Vecchiarelli HA**, Aukema R, Hill MN, Wong TP, Boksa P.  
Prenatal immune activation potentiates endocannabinoid-related plasticity of inhibitory synapses in the hippocampus of adolescent rat offspring.  
*Eur Neuropsychopharmacol*. 2018 Dec;28(12):1405-1417. doi: 10.1016/j.euroneuro.2018.09.003. Epub 2018 Sep
- Mayo LM, Asratian A, Lindé J, Holm L, Nätt D, Augier G, Stensson N, **Vecchiarelli HA**, Balsevich G, Aukema RJ, Ghafouri B, Spagnolo PA, Lee FS, Hill MN, Heilig M.  
Protective effects of elevated anandamide on stress and fear-related behaviors: translational evidence from humans and mice.  
*Mol Psychiatry*. 2020 May;25(5):993-1005. doi: 10.1038/s41380-018-0215-1. Epub 2018 Aug 17.
- Myers KA, **Vecchiarelli HA**, Damji O, Hill MN, Kirton A.  
Significance of BDNF Val66Met Polymorphism in Brain Plasticity of Children.  
*Pediatr Neurol*. 2017 Jan;66:e1-e2. doi: 10.1016/j.pediatrneuro.2016.09.015. Epub 2016 Oct 3.
- Morena M, Leitl KD, **Vecchiarelli HA**, Gray JM, Campolongo P, Hill MN.  
Emotional arousal state influences the ability of amygdalar endocannabinoid signaling to modulate anxiety.  
*Neuropharmacology*. 2016 Dec;111:59-69. doi: 10.1016/j.neuropharm.2016.08.020. Epub 2016 Aug 20.
- Effects of maternal stress and perinatal fluoxetine exposure on behavioral outcomes of adult male offspring.  
Kiryanova V, Meunier SJ, **Vecchiarelli HA**, Hill MN, Dyck RH.  
*Neuroscience*. 2016 Apr 21;320:281-96. doi: 10.1016/j.neuroscience.2016.01.064. Epub 2016 Feb 9.
- Vecchiarelli HA\***, Gandhi CP\*, Hill MN.  
Acute Psychological Stress Modulates the Expression of Enzymes Involved in the Kynurenine Pathway throughout Corticolimbic Circuits in Adult Male Rats.  
*Neural Plast*. 2016;2016:7215684. doi: 10.1155/2016/7215684. Epub 2015 Dec 27.
- Dickens MJ, **Vecchiarelli HA**, Hill MN, Bentley GE.  
Endocannabinoid Signaling in the Stress Response of Male and Female Songbirds.  
*Endocrinology*. 2015 Dec;156(12):4649-59. doi: 10.1210/en.2015-1425. Epub 2015 Oct 2.
- Qi M, Morena M, **Vecchiarelli HA**, Hill MN, Schriemer DC.  
A robust capillary liquid chromatography/tandem mass spectrometry method for quantitation of neuromodulatory endocannabinoids.  
*Rapid Commun Mass Spectrom*. 2015 Oct 30;29(20):1889-97. doi: 10.1002/rcm.7277.
- Vecchiarelli HA**, Gandhi CP, Gray JM, Morena M, Hassan KI, Hill MN.  
Divergent responses of inflammatory mediators within the amygdala and medial prefrontal cortex to acute psychological stress.  
*Brain Behav Immun*. 2016 Jan;51:70-91. doi: 10.1016/j.bbi.2015.07.026. Epub 2015 Aug 7.
- Qin Z, Zhou X, Pandey NR, **Vecchiarelli HA**, Stewart CA, Zhang X, Lagace DC, Brunel JM, Béique JC, Stewart AF, Hill MN, Chen HH.  
Chronic stress induces anxiety via an amygdalar intracellular cascade that impairs endocannabinoid signaling.  
*Neuron*. 2015 Mar 18;85(6):1319-31. doi: 10.1016/j.neuron.2015.02.015. Epub 2015 Mar 5.
- Gray JM, **Vecchiarelli HA**, Morena M, Lee TT, Hermanson DJ, Kim AB, McLaughlin RJ, Hassan KI, Kühne C, Wotjak CT, Deussing JM, Patel S, Hill MN.  
Corticotropin-releasing hormone drives anandamide hydrolysis in the amygdala to promote anxiety.  
*J Neurosci*. 2015 Mar 4;35(9):3879-92. doi: 10.1523/JNEUROSCI.2737-14.2015.
- Ramasubbu R, **Vecchiarelli HA**, Hill MN, Kiss ZH.  
Brain-derived neurotrophic factor and subcallosal deep brain stimulation for refractory depression.  
*World J Biol Psychiatry*. 2015 Feb;16(2):135-8. doi: 10.3109/15622975.2014.952775. Epub 2014 Sep 17.
- Gottfried-Blackmore A\*, Jellinck PH\*, **Vecchiarelli HA**, Masheeb Z, Kaufmann M, McEwen BS, Bulloch K.  
7 $\alpha$ -hydroxylation of dehydroepiandrosterone does not interfere with the activation of glucocorticoids by 11 $\beta$ -hydroxysteroid dehydrogenase in E(t)C cerebellar neurons.  
*J Steroid Biochem Mol Biol*. 2013 Nov;138:290-7. doi: 10.1016/j.jsbmb.2013.07.001. Epub 2013 Jul 12.

D'Agostino PM, Kwak C, **Vecchiarelli HA**, Toth JG, Miller JM, Masheeb Z, McEwen BS, Bulloch K.  
Viral-induced encephalitis initiates distinct and functional CD103+ CD11b+ brain dendritic cell populations within the olfactory bulb.  
*Proc Natl Acad Sci U S A*. 2012 Apr 17;109(16):6175-80. doi: 10.1073/pnas.1203941109. Epub 2012 Apr 2.

## PEER-REVIEWED CONTINUING MEDICAL EDUCATION (CME) ARTICLES

(\* denotes equal contribution)

**Vecchiarelli HA\***, Šimončíčová E\*, Tremblay MÈ.  
Microglial Involvement With Psychiatric Diseases.  
*Psychiatric Times*. 2021 Jan 12; 38(1):32-36.  
30 Category I CME Credits

## BOOK CHAPTERS

Gray JM, **Vecchiarelli HA**, Hill MN.  
Chapter 5: Endocannabinoid Signalling and Synaptic Plasticity During Stress  
*Synaptic Stress and Pathogenesis of Neuropsychiatric Disorders*. Popoli M., Diamond D., Sancora G. (Eds). 2014, XIV, 355.  
Springer Science + Business Media, 2014.

## INVITED TALKS

(^ denotes non-researcher audience)

2019 | CHUL, Université Laval, Québec City, QC, Canada  
2018 | Addition Medical Discovery Team, University of Minnesota, Minneapolis, MN, USA  
2015 | Branch Out Neurological Foundation 2015 Bike Ride Fundraiser, Panorama, BC, Canada^

## CONFERENCE ORAL PRESENTATIONS

(^ denotes non-researcher audience)

- 2022 "Microglia in stress, colitis and cannabis exposure: interactions with the (endo)cannabinoid system."  
Symposium—New perspectives on endocannabinoid signaling modulation of synaptic functions in physiological and pathological conditions.  
*Mediterranean Neuroscience Society Meeting*, Dubrovnik, Croatia.
- 2021 "Neuroinflammation Drives Changes in Endocannabinoids in the Amygdala Which Contribute to Anxiety-Like Behaviour in a Rat Model of Colitis."  
Symposium—Exploring the behavioral signature of abnormal brain endocannabinoid signaling.  
*National Congress of the Italian Society for Neuroscience*, Virtual meeting.
- 2019 "Interactions Between Endocannabinoids and Neuroinflammation in a Rat Model of Colitis."  
*Gordon Research Conference, Cannabinoid Function in the CNS*, Castelldefels, Spain.
- 2019 "Anxiety Comorbid with Colitis is Mediated by a Loss of Central Endocannabinoid Signaling"  
Trainee Research Award Spotlight Talk.  
*Annual Canadian Consortium for the Investigation of Cannabinoids Conference*, Toronto, ON, Canada.^  
Supported by Canadian Consortium for the Investigation of Cannabinoids Trainee Research Spotlight Award.
- 2018 "Colitis induced anxiety is mediated through a corticotropin-releasing factor receptor 1 suppression of central anandamide signaling."  
*International Congress of Neuroimmunology*, Brisbane, Qld, Australia.  
Supported by International Congress of Neuroimmunology Canadian Knowledge Dissemination Grant.
- 2017 "Peripheral Inflammation Promotes Anxiety Through a CRF-R1 Mediated Suppression of Central AEA Signaling."  
*Gordon Research Seminar, Cannabinoid Function in the CNS*, Waterville Valley, United States.
- 2017 "Dynamic Regulation of the Central Endocannabinoid System Induced by Colitis."  
*International Cannabinoid Research Society Meeting*, Montreal, QC, Canada.  
Supported by International Cannabinoid Research Society Travel Award.
- 2017 "Anxiety induced by peripheral inflammation is reversed by acute inhibition of fatty acid amide hydrolase."  
*Canadian Spring Conference on Behaviour and Brain*, Fernie, BC, Canada.

- 2016 "Inhibition of anandamide hydrolysis reverses anxiety induced by sustained peripheral inflammation."  
*International Cannabinoid Research Society Meeting*, Bukovina, Poland.  
Supported by Canadian Consortium for the Investigation of Cannabinoids, International Cannabinoid Research Society and Brain Canada Travel Awards.
- 2015 "Dynamic endocannabinoid responses to stress are influenced by both sex and stressor intensity."  
Nanosymposium—Peptides and Factors.  
*Society for Neuroscience Annual Meeting*, Chicago, IL, United States.  
Supported by Society for Neuroscience Trainee Professional Development Grant.
- 2015 "Colitis alters central endocannabinoid content."  
*Canadian Spring Conference on the Brain and Behaviour*, Fernie, BC, Canada.
- 2014 "Acute psychological stress induced circulating and central cytokine production."  
*Canadian Spring Conference on the Brain and Behaviour*, Fernie, BC, Canada.

## CONFERENCE POSTER PRESENTATIONS

- 2019 "Investigating the relationship between inflammation and endocannabinoids in the amygdala during colitis."  
*International Cannabinoid Research Society Meeting*, Washington D.C., USA.  
Supported by International Cannabinoid Research Society Travel Award.
- 2019 "Examining the interplay between inflammation and endocannabinoids in the amygdala during colitis."  
*Canadian Association for Neuroscience Annual Meeting*, Toronto, ON, Canada.  
Supported by Hotchkiss Brain Institute Keith Sharkey Graduate Travel Award.
- 2019 "Investigating the relationship between inflammation and endocannabinoids in the amygdala during colitis."  
*Annual Canadian Student Health Research Forum*, Winnipeg, MB, Canada.  
Supported by University of Calgary Vice President Research Office Travel Award.
- 2018 "A CRF-R1-Mediated Suppression of Anandamide Signaling is Necessary for Colitis-Induced Anxiety."  
*Annual Meeting of the Japan Neuroscience Society*, Kobe, Japan.  
Supported by Japan Neuroscience Society Travel Award.
- 2018 "Colitis promotes anxiety through a corticotropin-releasing factor receptor 1 mediated suppression of central anandamide signaling."  
*Federation of European Neuroscience Societies Forum*, Berlin, Germany.  
Supported by University of Calgary Faculty of Graduate Studies Travel Award.
- 2018 "Sex Differences In The Modulation Of Endocannabinoid Content By Peripheral Inflammation."  
*International Cannabinoid Research Society Meeting*, Leiden, Netherlands.  
Supported by University of Calgary Faculty of Graduate Studies and International Cannabinoid Research Society Travel Awards.
- 2018 "Colitis promotes anxiety through a corticotropin-releasing factor receptor 1 mediated suppression of central anandamide signaling."  
*Neurobiology of Stress Meeting*, Banff, AB, Canada.  
Trainee Poster Award Recipient.
- 2018 "Colitis promotes anxiety through a CRF-R1 mediated suppression of central anandamide signaling."  
*Canadian Association of Neuroscience Annual Meeting*, Vancouver, BC, Canada.
- 2017 "Colitis Promotes Anxiety Through a CRFR1Mediated Suppression of Central Anandamide Signaling."  
*American College of Neuropsychopharmacology Annual Meeting*, Palm Desert, CA, USA.  
Supported by Mathison Centre for Mental Health Research and Education Travel Award.
- 2017 "Peripheral inflammation promotes anxiety through a CRF-R1 mediated suppression of central AEA signaling."  
*Society for Neuroscience Annual Meeting*, Washington DC, USA.  
Supported by Hotchkiss Brain Institute Arun Anbazhagan Society for Neuroscience Travel Award.
- 2017 "Peripheral Inflammation Promotes Anxiety Through a CRF-R1 Mediated Suppression of Central AEA Signaling."  
*Gordon Research Conference, Cannabinoid Function in the CNS*, Waterville Valley, NH, USA.
- 2017 "Sustained Peripheral Inflammation Triggers Central Anandamide Hydrolysis to Promote Anxiety."  
*Stress: Past, Present and Future Directions*, Princeton, NJ, USA.  
Supported by Stress Meeting Travel Award.
- 2017 "Sustained Peripheral Inflammation Triggers Central Anandamide Hydrolysis to Promote Anxiety."  
*Annual Canadian Student Health Research Forum*, Winnipeg, MB, Canada.  
Supported by University of Calgary Vice President Research Office Travel Award.

- 2017 "Sustained Peripheral Inflammation Triggers Central Anandamide Hydrolysis to Promote Anxiety."  
*Annual Canadian Association for Neuroscience Meeting*, Montreal QC, Canada.  
Supported by Canadian Association for Neuroscience International Brain Research Society Travel Award.
- 2017 "Peripheral Inflammation Triggers Anandamide Hydrolysis to Promote Anxiety."  
*Gordon Research Conference Neuro-Immune Interactions During Homeostasis and Neurological Disorders*,  
Ventura, CA, USA.
- 2016 "Sustained peripheral inflammation triggers anandamide hydrolysis to promote anxiety."  
*Society for Neuroscience Annual Meeting*, San Diego, CA, USA.  
Supported by Hotchkiss Brain Institute Conference Travel Award.
- 2016 "Colitis Alters Endocannabinoid Signalling in Corticolimbic Brain Structures in the Adult Male Rat."  
*Federation of European Neuroscience Societies Forum*, Copenhagen, Denmark.  
Supported by Federation of European Neuroscience Societies IBRO/PERC and Brain Canada Travel Awards.
- 2016 "Dynamic Endocannabinoid Response to Stress Exposure: Influenced by Sex and Stressor Intensity."  
*Neurobiology of Stress Workshop*, Irvine, CA, USA.  
Supported by Neurobiology of Stress Travel Award.
- 2015 "Chronic colitis modifies corticolimbic endocannabinoid levels."  
*World Congress of the International Brain Research Organization*, Rio de Janeiro, Brazil.  
Supported by International Brain Research Organization Travel Grant.
- 2015 "Divergent Amygdalar and Prefrontal Cortex Delayed Inflammatory Mediator Responses to Acute Psychological  
Stress Exposure."  
*Annual Psychoneuroimmunology Research Society Meeting*, Seattle, WA, USA.
- 2014 "Acute psychological stress induced circulating and central cytokine production."  
*Society for Neuroscience Annual Meeting*, Washington, D.C., USA.  
Supported by Graduate Science Education Travel Grant.
- 2014 "Acute psychological stress induced circulating and central cytokine production."  
*Federation of European Neuroscience Societies Forum*, Milan, Italy.  
Supported by Society for Neuroscience Federation of European Neuroscience Societies Forum Travel Award.
- 2014 "Colitis alters central endocannabinoid content."  
*International Cannabinoid Research Society Annual Meeting*, Baveno, Italy.  
Supported by Canadian Consortium for the Investigation of Cannabinoids and International Cannabinoid  
Research Society Travel Awards.
- 2013 "Sex differences observed in the effects of acute and repeated restraint stress on limbic endocannabinoid  
function."  
*Society for Neuroscience Annual Meeting*, San Diego, CA, USA.  
Supported by University of Calgary Grants Research Council Travel Award.
- 2013 "Sex dependent effects of repeated stress on limbic endocannabinoid function."  
*International Cannabinoid Research Society Annual Meeting*, Vancouver, CB, Canada.  
Supported by International Cannabinoid Research Society Travel Award.
- 2012 "EYFP+ dendritic cells observed juxtaposed with ACTH+ cells in the pituitary of the Itgax(CD11c)-EYFP+ mouse."  
*Society for Neuroscience Annual Meeting*, New Orleans, LA, USA.
- 2011 "Investigating the origins of vesicular stomatitis virus-stimulated dendritic cell populations in the olfactory bulb."  
*Society for Neuroscience Annual Meeting*, Washington D.C., USA.

## AWARDS

### HONOURS, RECOGNITIONS AND DISTINCTIONS

- 2020 University of Calgary, President's Award for Excellence in Student Leadership
- 2019 University of Calgary, Graduate Students' Association Graduate Citizenship Award (\$2,000 CDN)
- 2019 University of Calgary, Graduate Students' Association Leadership Award (\$5,000 CDN)
- 2016 University of Calgary, Graduate Students' Association Lifetime Achievement Award
- 2016 University of Calgary, Hotchkiss Brain Institute PhD Researcher of the Year
- 2015 Government of Alberta, Graduate Citizenship Award (\$2,000 CDN)
- 2015 University of Calgary, Graduate Students' Association Award for Outstanding Contribution
- 2014 Government of Alberta, Graduate Citizenship Award (\$2,000 CDN)
- 2010 Barnard College, Dean's List

- 2009 Barnard College, Student Leader Award  
 2007 Girl Scout Arizona Cactus Pine Council, Young Woman of Distinction, World of Learning  
 2006 Girl Scout Arizona Cactus Pine Council, Gold Award

## FELLOWSHIPS, SCHOLARSHIPS AND RESEARCH AWARDS

- 09/2020—08/2023 Michael Smith Health Research BC—Research Trainee Incentive Award  
\$42,250 CDN
- 07/2020—06/2023 Canadian Institutes of Health Research—Fellowship  
\$135,000 CDN
- 05/2018—01/2020 University of Calgary, Killam Trusts—Izaak Walton Killam Doctoral Scholarship  
\$39,000 CDN
- 09/2015—09/2019 Branch Out Neurological Foundation—PhD Grant  
\$34,000 CDN
- 07/2015—06/2019 Alberta Innovates-Health Solutions—Graduate Studentship  
\$58,600 CDN
- 05/2016—05/2019 Canadian Institutes of Health Research—Vanier Canadian Graduate Studentship  
\$150,000 CDN
- 09/2015—12/2018 University of Calgary—Achievers in Medical Science Research Excellence Award  
\$14,000 CDN
- 11/2014—10/2017 University of Calgary, Hotchkiss Brain Institute—Dr. T. Chen Fong Doctoral Scholarship  
(declined) \$96,000 CDN
- 09/2015—08/2016 University of Calgary—Eyes High International Doctoral Scholarship  
(declined) \$12,000 CDN
- 09/2014—08/2015 University of Calgary—Achievers in Medical Science Graduate Recruitment Scholarship  
\$25,000 CDN
- 09/2014—08/2015 University of Calgary—Eyes High International Doctoral Studentship  
\$12,000 CDN
- 01/2015—04/2015 University of Calgary—Distinguished Faculty Achievement Doctoral Scholarship  
\$4,000 CDN
- 05/2013—08/2013 Canadian Consortium for the Investigation of Cannabinoids—Graduate Student Summer  
Research Support  
\$5,000 CDN
- 09/2009—05/2010 United States Department of Education—SMART Grant  
\$2,000 USD
- 05/2009—08/2009 Barnard College Biology Department—Donald & Nancy Ritchie Fund; Edna Henry Bennet Fund  
\$2,750 USD + Housing
- 05/2008—08/2008 National Science Foundation—Research Experience for Undergraduates, Shenandoah  
Partnership for Molecular Biology  
\$4,500 USD + Housing and Food Allowance
- 05/2007—08/2007 Barnard College Howard Hughes Medical Institute Pipeline Program—Summer Research Grant  
\$4,000 USD
- 09/2006—05/2007 United States Department of Education—Academic Competitiveness Grant  
\$750 USD

## TRAVEL, PRESENTATION AND OTHER AWARDS

- 2019 University of Calgary Vice President Research Office Travel Award (\$1,000 CDN)  
 2019 International Cannabinoid Research Society Travel Award (\$550 USD)  
 2019 University of Calgary Hotchkiss Brain Institute Keith Sharkey Graduate Travel Award (\$1,000 CDN)  
 2019 Canadian Consortium for the Investigation of Cannabinoids Trainee Research Spotlight Award (\$1,000 CDN)  
 2018 International Society of Neuroimmunology Canadian Knowledge Dissemination Grant (\$1,000 CDN)  
 2018 Stress Neurobiology Workshop Trainee Poster Award (\$75 CDN)  
 2018 International Cannabinoid Research Society Travel Award (\$550 USD)  
 2018 University of Calgary Faculty of Graduate Studies Travel Award (\$1,000 CDN)

- 2018 University of Calgary Department of Psychiatry Research Day "Most Innovative Presentation by a Graduate Student" (\$250 CDN)
- 2018 Society for Neuroscience Travel Award to Japan Neuroscience Society Annual Meeting (\$2,000 USD; *declined*)
- 2018 Japan Neuroscience Society Travel Award (JP¥ 150,000)
- 2017 University of Calgary Hotchkiss Brain Institute Arun Anbazhagan Society for Neuroscience Meeting Travel Award (\$1,000 CDN)
- 2017 University of Calgary Vice President Research Office Travel Award (\$1,000 CDN)
- 2017 Stress: Past, Present and Future Directions Travel Award (\$1,000 USD)
- 2017 International Cannabinoid Research Society Travel Award (\$350 USD)
- 2017 International Brain Research Organization Canadian Association for Neuroscience Meeting Travel Award (\$500 CDN)
- 2016 Brain Canada Dr. Hubert van Tol Travel Fellowship (\$5,000 CDN)
- 2016 University of Calgary Hotchkiss Brain Institute Conference Travel Award (\$500 CDN)
- 2016 Catania International Summer School of Neuroscience Travel Award (€500)
- 2016 International Cannabinoid Research Society Travel Award (\$550 USD)
- 2016 Canadian Consortium for the Investigation of Cannabinoids Travel Award (\$1,250 CDN)
- 2016 Federation of European Neuroscience Societies IBRO/PERC Travel Award (€600)
- 2016 Neurobiology of Stress Workshop Travel Award (\$750 USD)
- 2016 University of Calgary Hotchkiss Brain Institute Publication Award (\$100 CDN)
- 2015 Society for Neuroscience Trainee Professional Development Award (\$1,000 USD)
- 2015 University of Calgary Department of Neuroscience Travel Award (\$700 CDN)
- 2015 University of Calgary Graduate Students' Association Professional Development Grant (\$500 CDN)
- 2015 University of Calgary Graduate Science Education Travel Award (\$600 CDN)
- 2015 International Brain Research Organization World Congress Travel Award (€1,400)
- 2014 International Cannabinoid Research Society Travel Award (\$550 USD)
- 2014 Society for Neuroscience Federation of European Neuroscience Societies Forum Travel Award (\$2,000 USD)
- 2014 Canadian Association for the Investigation of Cannabinoids Travel Award (\$1,000 CDN)
- 2013 University of Calgary Research Grants Council International Grad Student Travel Award (\$750 CDN)
- 2013 University of Calgary Hotchkiss Brain Institute Student Travelling Fellowship for a Course (\$1,600 CDN)
- 2013 International Cannabinoid Research Society Travel Award (\$550 USD)

## TEACHING

### CREDENTIALS

- 2018 | University of Calgary SAGES (SoTL Advancing Graduate Education in STEM) Scholar
- 2012 | New York Academy of Sciences Education Fellow Teaching Credential

### GUEST LECTURER

Fall 2021	University of Victoria	NRSC 501/601 Advanced Topics in Cellular Neuroscience
Fall 2019	University of Calgary	MDSC 402 Organismal Biology
Winter 2018	University of Calgary	PSYC 475 Drugs and Behaviour

### TEACHING ASSISTANTSHIPS

Fall 2021	University of Victoria	NRSC 501/601 Advanced Topics in Cellular Neuroscience
Spring 2022	University of Victoria	NRSC 501/601 Advanced Topics in Cellular Neuroscience
Fall 2009	Barnard College	BIOL 3311 Laboratory in Cellular Biology

### OUTREACH

- 09/2011—05/2012 New York Academy of Sciences STEM After-School Course in Genetics
- 09/2011—08/2012 Biobus



## SUPERVISION & MENTORSHIP

### UNDERGRADUATE HONOURS AND DIRECTED STUDIES SUPERVISION

09/2019—12/2021	<u>Sophia Loewen</u> Supervisor: Co-Op Work Placement Co-Supervisor: Honours Thesis, Directed Studies
09/2018—05/2019	<u>Sonia Martins</u> Co-Supervisor: Independent Studies, Honours Thesis
09/2017—05/2019	<u>Vincent Chiang</u> Co-Supervisor: Independent Studies, Summer Research Position, Honours Thesis
05/2016—08/2017	<u>Kaitlyn Tan</u> Co-Supervisor: Summer Research Positions
05/2013—08/2015	<u>Chaitanya Gandhi</u> Co-Supervisor: Summer Research Positions
05/2013—08/2013	<u>Vanessa Hill</u> Co-Supervisor: Summer Research Position

### MENTORING ACTIVITIES

09/2014—05/2015	University of Calgary, Hotchkiss Brain Institute Trainee Organization Mentoring Program
09/2010—05/2012	Barnard College Alumnae to Student Mentoring Program

## SERVICE

### PEER REVIEW & EDITORIAL ACTIVITIES

#### EDITORIAL ACTIVITIES

2022	Guest Topic Editor, <i>Frontiers in Neuroscience</i> "Cannabinoids in Neuroinflammation, Neurodegeneration and Pain: Focus on Non-Neuronal Cells"
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#### JOURNAL REVIEW ACTIVITIES

<i>Ad Hoc</i>	<i>Brain, Behavior and Immunity; European Neuropsychopharmacology; Neurobiology of Stress; Neurochemical Research; Neuropharmacology</i>
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#### CONFERENCE ABSTRACT REVIEW ACTIVITIES

2020	Black in Neuro Conference
2020	SACNAS National Diversity in STEM Conference
2018	International Cannabinoid Research Society Annual Meeting
2017	International Cannabinoid Research Society Annual Meeting

## RESEARCH GRANT & AWARDS ASSESSMENT

### RESEARCH & SCHOLARSHIP FUNDING ASSESSMENT

2022—	Canadian Institutes of Health Research Committee Member, Doctoral Research Awards - A
2019—	Branch Out Neurological Foundation Scientific Review Panel, Undergraduate Grant Scientific Review Panel, Graduate Grant Scientific Review Panel, PI Special Purpose Grants

### AWARD ASSESSMENT

2020	Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) National Diversity in STEM Conference Travel Awards
2018—2019	University of Calgary U Make a Difference Awards Committee

- 2016—2019 University of Calgary, Cumming School of Medicine Alumni Advisory Council  
Alumni of Distinction Selection Committee
- 2014—2019 University of Calgary, Graduate Students' Association Awards Committee  
(Chair 2017—2019) Professional Development Grants  
Bursaries  
Graduate Citizenship Awards  
Excellence Awards  
Research Innovation Awards
- 2018 University of Calgary  
Teaching Awards Committee

## PROMOTIONS, TENURE AND SEARCH COMMITTEES

### SEARCH & SELECTION COMMITTEES

- 2016 University of Calgary, Cumming School of Medicine, Department of Psychiatry, Neurostimulation for Psychiatric Conditions
- 2015 University of Calgary, Cumming School of Medicine, Department of Psychiatry, Cuthbertson and Fischer Chair in Pediatric Mental Health

### ROLE REVIEW COMMITTEES

- 2017 University of Calgary, Cumming School of Medicine, Physiology and Pharmacology Department  
Headship Review
- 2017 University of Calgary, Cumming School of Medicine, Medical Genetics Department Headship Review

### MERIT REVIEW COMMITTEES

- 2015 University of Calgary, Cumming School of Medicine, Faculty Merit Review Committee

## COMMITTEE MEMBERSHIP

### BOARD OF DIRECTORS POSITIONS

- 2017—2019 International Cannabinoid Research Society, Trainee Representative

### UNIVERSITY COMMITTEES

- 2016—2019 University of Calgary, Cumming School of Medicine Alumni Advisory Council
- 2016—2019 University of Calgary, University Animal Welfare Committee
- 2016—2017 University of Calgary, Cumming School of Medicine Executive Faculty Council
- 2016—2017 University of Calgary, Cumming School of Medicine Faculty Council
- 2016—2017 University of Calgary, Graduate Science Education Committee

### EQUITY, DIVERSITY AND INCLUSION COMMITTEES

- 2019— International Cannabinoid Research Society
- 2020—2021 University of Victoria, Division of Medical Sciences
- 2018—2019 University of Calgary, Hotchkiss Brain Institute

## EVENT ORGANIZATION

### NATIONAL AND INTERNATIONAL CONFERENCES AND SYMPOSIA

- 2020 Keystone Symposia Programming Consultant, 2022 Study Group Member
- 2019 Gordon Research Seminar co-Chair, Cannabinoid Function in the CNS

### LOCAL CONFERENCES AND SYMPOSIA

- 2013—2018 University of Calgary, Cumming School of Medicine Symposium Planning Committee Member
- 2015—2018 University of Calgary, Mathison Centre for Mental Health Research & Education, Youth Mental Health Day Planning Committee Member
- 2014—2017 University of Calgary, Hotchkiss Brain Institute Summer Student Symposium Organizer
- 2013—2015 University of Calgary, Hotchkiss Brain Institute Research Day Planning Committee Member
- 2008—2010 Columbia University, Columbia Undergraduate Science Journal Research Symposium

**COMMUNITY, OUTREACH & VOLUNTEER ACTIVITIES**

- 2021— University of Victoria, Women in Science  
Symposium Judge  
Resume and Grant Application Workshop
- 2020— Science Fair Foundation BC, Judge
- 2013— Barnard College, Barnard Alumnae Admissions Representative
- 2016—2019 University of Calgary, Graduate Leaders Circle
- (Lead 2018—2019) Scholarship Cafes (Vanier, Tri-Council Doctoral and Masters, Graduate Award Competition)  
Scholarship Help Drop-In Hours  
Rising Leaders Symposium
- 2014—2019 University of Calgary, Graduate Students' Association  
Senior Leadership Team (2014—2019)  
Student Experience Committee (Chair, 2014—2016)  
Council of Foothills Departmental Graduate Students' Association (Chair, 2015-2016)  
Newcomers and International Students Committee (Chair, 2016—2017)  
Awards Committee (Chair, 2017—2019)  
External Relations Committee  
Clerk, Graduate Representative Council (2017—2019)
- 2013—2019 Calgary Brain Bee  
Planning Committee Member (2014—2017)
- 2012—2019 University of Calgary, Hotchkiss Brain Institute Trainee Organization
- 2013—2015 Calgary Youth Science Fair, Judge
- 2006—2012 New York Cares, Volunteer
- 2009—2010 Columbia Political Review, Layout Editor
- 2008—2010 Columbia Undergraduate Science Journal, Executive Vice President, Production and Technology
- 2006—2010 Columbia Daily Spectator  
Senior Staff Photographer (2008—2010)  
The Eye Magazine, Layout Editor (2009)  
Production Editor (2008)